

Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) EP 0 831 606 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
25.03.1998 Bulletin 1998/13

(51) Int. Cl.⁶: H04H 1/00, H04N 7/08

(21) Application number: 97114761.6

(22) Date of filing: 26.08.1997

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE

(30) Priority: 02.09.1996 JP 231655/96

(71) Applicant: HITACHI, LTD.
Chiyoda-ku, Tokyo 100 (JP)

(72) Inventors:
• Katsuki, Manabu
Totsuka-ku, Yokohama-shi, Kanagawa-ken (JP)

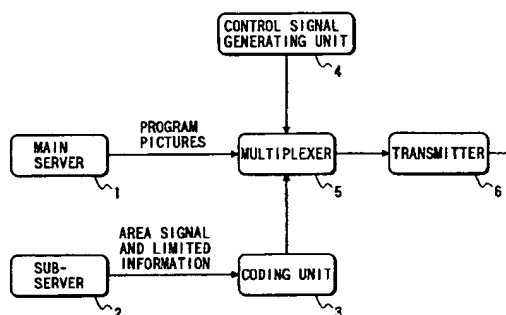
• Higuchi, Sigemitsu
Fujisawa-shi, Kanagawa-ken (JP)

(74) Representative:
Altenburg, Udo, Dipl.-Phys. et al
Patent- und Rechtsanwälte,
Bardehle . Pagenberg . Dost . Altenburg .
Frohwitter . Geissler & Partner,
Galileiplatz 1
81679 München (DE)

(54) **Method of transmitting a broadcast signal, such as a videosegment, comprising a main signal and a supplementary signal relevant for limited area, and transmitting apparatus and receiving apparatus therefor**

(57) A method for transmitting an information signal such as pictures and a transmitting apparatus and a receiving apparatus for this signal, wherein transmitting a limited information signal, a signal for showing an area to which the limited information signal is applied, and a control signal for controlling the display are transmitted, permits transmitting information closely linked to the area of subscribers and displaying this information at a predetermined time to realize a transmission of information effective for subscribers and increase convenience of the subscribers. Further, transmitting following frequency multiplexing or time-axis multiplexing the main information signal and the limited information signal and multiplexing a plurality of the limited information signals by time-division permits the limited information signals corresponding to many areas to be transmitted. Whereby detailed information can be provided so that subscribers convenience can be further improved. Still further, transmitting menu screen information or the like enables subscribers to select a limited information signal of an area different from the limited information signal of a pre-set area for improving the customers convenience.

FIG. 1



Description

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a method of transmitting a wide-band broadcasting such as a television broadcasting and a transmitting and receiving apparatus therefor, and relates more particularly to a transmission method and a system structure suitable for transmitting and receiving limited information to and in a narrower area than a transmission area.

Description of the Prior Art

In a wide-band broadcasting as represented by a broadcasting of pictures, conventionally the same program has been broadcasted by using a carrier such as radio waves, for example, to all the transmission areas from a broadcasting station. Further, at a receiver side, a picture signal of a television program broadcasted by a carrier such as radio waves is received by a signal receiver and is demodulated so that the picture is reproduced by a picture receiver.

A result of a first study made by the applicant within the company will be explained below with reference to Fig. 7. Referring to Fig. 7, a reference numeral 201 denotes a broadcasting station, 202a and 202b subscribers and 203 a broadcasting area. In Fig. 7, the broadcasting station 201 transmits program pictures by using radio waves, for example, to the broadcasting area 203. On the other hand, the subscribers 202a and 202b receive the radio waves transmitted by an antenna respectively, demodulate by a picture receiver the picture signal of the program transmitted by the carrier such as radio waves and obtain pictures on the picture receivers. One example of the structure of transmission facilities in the broadcasting station 201 is shown in Fig. 8 and its operation will be explained below. In Fig. 8, reference numerals 211 denotes a server for storing program pictures to be broadcasted, 212 a transmitter, and 213 a transmission antenna. In the broadcasting station 201, program pictures are supplied from the server 211 to the transmission facilities 212 according to a predetermined TV program based on a predetermined time schedule, and the program pictures are modulated into a transmission signal and this signal is amplified. The transmission signal is transmitted to the broadcasting area 203 shown in Fig. 7 from the transmission antenna 213. In this case, a TV program includes a sports program, a commercial, weather forecast and a movie, for example, as shown in Fig. 9. Program pictures for each program are arranged in time series at predetermined times. Next, one example of the structure of the receiving facilities at the subscriber 202a side is shown in Fig. 10. In Fig. 10, reference numerals 231 denotes a receiving antenna, 232 a receiving apparatus and 233 a picture receiver.

The subscriber 202a receives with the receiving antenna 231 the radio waves transmitted from the broadcasting station 201, demodulates the received signal into a picture signal by the receiving apparatus 232, and displays the demodulated picture signal of the TV program in pictures by the picture receiver 233. In the mean time, the subscriber 202b also has a similar structure and displays the picture of a TV program in the picture receiver in a similar manner. As explained above, according to the current structure, the subscribers in the broadcasting area 203 can watch TV programs transmitted in time series at the same time by the picture receivers.

The above-described structure has been efficient since programs can be broadcasted to a wide broadcasting area with one set of transmission facilities. However, according to the above-described structure, it is considered that sufficient considerations have not been given to the broadcasting of area limited information to the subscribers who are staying in that area. Taking a weather forecast as an example, a predetermined time is allocated to the weather forecast in a TV program. Accordingly, there is a limit to the amount of information on the weather forecast which can be broadcasted within this allocated time. For example, only the weather forecast relating to the whole broadcasting area can be broadcasted. However, when the broadcasting area is widely distributed, there is a case where the weather information is changing depending on the areas where the subscribers are staying. It has been known that in such a case, the conventional structure has a problem in that subscribers can not obtain weather information of the areas of the subscribers. The above problem similarly arises in other information such as commercial and traffic information, for example. In other words, it has been known that according to the conventional structure, when subscribers want to know relatively sufficient information of a narrow area as compared with the information on the whole area, they can not obtain such information because of the wide broadcasting area.

SUMMARY OF THE INVENTION

In view of the foregoing, it is a main object of the present information to achieve a transmission and receiving of information on a narrow area even in a wide-band broadcasting to thereby realize more convenient broadcasting for subscribers.

In order to achieve the above-mentioned object, in the first aspect of the present invention there is provided, in the transmission of information signals such as picture signals, a main information signal for transmitting program pictures and coded signals of a limited information signal such as commercial information and an area signal for showing an applied area of the limited information signal are multiplexed and that a control signal for starting the display of the above-described limited information signal at a predetermined time is also

included in the information signal for transmission.

A control signal for ending the display of the above-described limited information signal at a predetermined time is also included in the above-described control signal for transmission.

There are a plurality of combinations of the limited information signals and the area signals and these are coded and transmitted in time series.

All the plurality of limited information signals before they are coded have the same display time when they are displayed in pictures respectively.

Menu screen information is transmitted to enable the subscribers to select easily a limited information signal to be displayed on the picture receiver from the plurality of limited information signals.

The main information signal, the limited information signal and the area signal are transmitted by being frequency multiplexed.

Furthermore, at least the main information signal and the limited information signal are transmitted by being time-division multiplexed.

In the second aspect of the present invention there is provided, in the transmission of information signals such as picture signals, a plurality of the limited information signals and the area signals are coded and that at the time of transmitting the coded signals by time-division multiplexing with the main information signal, the transmission time of the coded signals becomes a predetermined time.

In the third aspect of the present invention there is provided, in a transmitting apparatus for transmitting information signals such as picture signals, the transmitting apparatus is structured to include:

a storage unit for storing a main information signal such as program pictures, a limited information signal such as a commercial and an area signal for showing an applied area of this limited information signal,

a coding unit for coding a limited information signal read from the storage unit and an area signal,

a control signal generating unit for generating a control signal relevant to the display of the limited information signal, and

a multiplexing unit for multiplexing a main information signal output from the storage unit, a coded signal from the coding unit and a control signal from the control signal generating unit and for generating a transmission signal.

In the fourth aspect of the present invention there is provided, in a receiving apparatus for receiving an information signal such as a picture signal, the receiving apparatus is structured to include:

a unit for extracting the main information signal and the coded signal from a received signal,

a unit for decoding a signal for showing an applied

area from an extracted coded signal,

a display control signal generating unit for detecting a control signal relevant to a display of a limited information signal from the received signal and for generating a display control signal based on the detected signal,

a control signal generating unit for generating a control signal for selecting a limited information signal to be displayed,

a limited information storage unit for storing a limited information signal coded according to the decoded signal for showing an applied area and for reading a coded limited information signal corresponding to the control signal based on a timing of the display control signal,

a unit for decoding a limited information signal from a signal read from the limited information storage unit, and

an output change-over unit for selecting a main information signal from the extracting unit based on a display control signal from the display control signal generating unit and an output signal from a limited information signal from the limited information signal decoding unit.

The display control signal generating unit includes a unit for generating a display control signal so that a main information signal is displayed after a predetermined period of time since the display control signal generating unit has started a display of a limited information signal.

The control signal generating unit includes a memory unit for storing an optional control signal.

A telephone line is connected to the control signal generating unit and the control signal generating unit includes a unit for setting a control signal through the telephone line.

Furthermore, the control signal relating to the display includes menu screen information, the display control signal generating unit includes a unit for generating selective screen information for facilitating a selection from the menu screen information, and the control signal generating unit includes a unit for generating a control signal based on the selective screen information.

According to the structure of the first aspect of the present invention, in the transmission of information signals such as picture signals, a main information signal for transmitting program pictures and a limited information signal for transmitting the coded limited information signal such as commercial information are multiplexed, and an area signal for showing an area to which the limited information signal is applied is coded, and a control signal for displaying the limited information signal at a predetermined time is transmitted. Accordingly, information closely linked to the areas of subscribers can be transmitted, and further, the display of this information can be started at a predetermined time.

By transmitting a control signal for ending the dis-

play of the limited information at a predetermined time, the display of main information can be started compulsively even if the display of the limited information signal is not finished within a predetermined time period due to an error of a storage medium or the like, for example, at the subscriber side. Therefore, it becomes possible to avoid an occurrence of time loss in program pictures.

By transmitting the limited information and the area signal by a plurality of number in time-series, the areas to which the limited information are applied can be narrowed so that further detailed information can be provided.

By setting the time for displaying a plurality of pre-coded limited information signals in pictures to be all the same, all the selective displays of the limited information signals received in different areas or by different subscribers can be finished at the same time. Accordingly, it is possible to avoid an occurrence of a disturbance of program pictures structured by a main information signal depending on areas and subscribers.

By transmitting menu screen information for selecting a limited information signal to be displayed by a picture receiver from a plurality of limited information signals, a subscriber can easily select a limited information signal of an area different from the limited information signal of a pre-set area. This helps to further increase the convenience of the subscribers.

By transmitting the main information signal and limited information signals by multiplexing the frequencies of these signals, the limited information signals corresponding to many areas can be transmitted during the period while program pictures are being transmitted in the main information signal. This enables a provision of further detailed information.

By time-axis compressing program pictures in the picture information signal, the main information signal and the limited information signals can be transmitted by time-axis multiplexing, so that the limited information signals corresponding to many areas can be transmitted during the period while the program pictures are being transmitted in the main information signal. This enables a provision of further detailed information.

Next, according to the second aspect of the present invention, by coding a plurality of the limited information signals and the signals for showing the applied areas of the limited information signals and further by setting the time of transmitting the coded signals at a predetermined time when transmitting the coded signals by time-division multiplexing with the main information signal, the plurality of limited information signals can be transmitted within a time for displaying the limited information signals, so that information closely linked to the areas of the subscribers can be transmitted.

According to the third aspect of the present invention, in a transmitting apparatus for transmitting information signals such as picture signals, a main information signal for transmitting program pictures, a limited information signal such as a commercial and an area signal

are coded and multiplexed, and a control signal for displaying the limited information signal is also multiplexed for transmission. Therefore, information closely linked to the areas of the subscribers can be transmitted and, at the same time, the display of these information can be started at a predetermined time so that this increases the convenience of the subscribers.

According to the fourth aspect of the present invention, the picture signal receiving apparatus extracts the main information signal and the coded signal from a received signal, decodes a signal for showing an applied area of the limited information from the extracted coded signal, stores the coded limited information signal in a limited information storing unit according to the decoded area signal, reads from the limited information storing unit a display control signal from a display control signal generating unit for detecting a control signal relevant to the display of the limited information signal and for controlling the display and a limited information signal selected from a plurality of limited information signals based on a control signal for selecting a limited information to be displayed, and decodes and outputs these information. Therefore, information closely linked to the areas of the subscribers can be displayed during a period of time for displaying the limited information signals, which can help to increase the convenience of the subscribers.

Since a display control signal is generated so that the main information signal is displayed after a predetermined period of time since the display control signal generating unit started the display of a limited information signal, information closely linked to the areas of the subscribers can be displayed during the period while the limited information signal is being displayed. Further, even if an error has occurred in the limited information storing unit, the main information signal can be displayed without displaying the limited information signal again, so that time loss is not generated in the program pictures.

Since the control signal generating unit is structured to include a memory unit for storing a desired control signal, a control signal can be automatically set at the time of displaying the limited information signal, so that the subscribers need not set the selection each time.

Since a telephone line is connected to the control signal generating unit and a control signal of the control signal generating unit can be set through the telephone line, the control signal of the limited information signal can be automatically set, so that the subscribers need not set the selection each time.

Furthermore, the display control signal generating unit generates selective screen information from the transmitted menu screen information, and a subscriber selects a limited information based on the selective screen information when necessary so that a control signal is generated from the control signal generating unit accordingly. Therefore, a subscriber can easily

select a limited information signal of an area different from the limited information signal of a pre-set area. This helps to further increase the convenience of the subscribers.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram for showing a mode of one embodiment of the transmitting apparatus according to the present invention.

Fig. 2 is a diagram for showing a mode for implementing signals in the transmitting apparatus of the present invention.

Fig. 3 is a diagram for showing another mode for implementing signals in the transmitting apparatus of the present invention.

Fig. 4 is a diagram for showing another mode for implementing signals in the transmitting apparatus of the present invention.

Fig. 5 is a block diagram for showing a mode of one embodiment of the receiving apparatus according to the present invention.

Fig. 6 is a block diagram for showing one embodiment of the control signal generating unit according to the present invention.

Fig. 7 is a block diagram for showing the structure of a conventional picture broadcasting.

Fig. 8 is a block diagram for showing a mode of one embodiment of a conventional transmitting apparatus.

Fig. 9 is a diagram for showing a mode for implementing signals in the conventional transmitting apparatus.

Fig. 10 is a block diagram for showing a mode of one embodiment of the conventional receiving apparatus.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Modes of embodiments of the present invention will be explained below with reference to the drawings.

Fig. 1 is a block diagram for showing one example of the transmitting apparatus according to the present invention. In Fig. 1, reference numerals 1 denotes a main server for storing main information signals such as program pictures and 2 denotes a sub-server for storing limited information signals such as weather forecast and commercials, for example, in each area and area signals for showing applied areas. The main server 1 and the sub-server 2 which are the information signal storing units are structured by a tape storage unit such as a VTR or a disc storage unit such as a hard disc or an optical disc, or a memory, which are not limited. Reference numerals 3 denotes a coding unit for coding limited information signals and area signals, 4 a control signal generating unit for generating control signals relevant to the display of limited information signals, 5 a multiplexer for multiplexing main information signals and

limited information signals, and 6 a transmitter. The operation of Fig. 1 will be explained below.

Referring to Fig. 1, according to a predetermined time schedule, program pictures are supplied as a main information signal from the main server 1 to the multiplexer 5. In the mean time, limited information signals and area signals output from the sub-server 2 are supplied to the coding unit 3 and these signals are converted to limited information codes and applied area codes and are then supplied to the multiplexer 5. The control signal generating unit 4 generates a start control signal for starting the display of limited information signals at a predetermined time at the subscribers side, for example, and supplies the start control signal to the multiplexer 5. The multiplexer 5 multiplexes the main information signals from the main server 1, the limited information codes and the applied area codes from the coding unit 3 and the start control signal from the control signal generating unit 4, modulates these signals to generate a transmission signal and outputs this signal to the transmitter 6. The transmitter 6 amplifies the transmission signal from the multiplexer 5 and transmits the applied signal to the subscribers. One example of multiplexing signals by the multiplexer 5 will be explained below with reference to Fig. 2.

Referring to Fig. 2, reference symbols a denotes a main information signal, b denotes a signal for showing a limited information code and an applied area code output from the coding unit 3, and c denotes a multiplexed signal. The main information signal includes program pictures read from the main server 1 according to a predetermined time schedule, and covers in time-series a normal program such as a drama, a nationwide commercial, a nation-wide weather forecast and a normal program, for example, as shown in Fig. 2a. Next, the coding unit 3 codes the limited information signals and area signals read from the sub-server 2, and outputs a plurality of area codes and limited information codes in time-series as coded signals as shown in Fig. 2b, for example. In this case, the same time is set for displaying in pictures the plurality of limited information signals read from the sub-server 2. Next, the multiplexer 5 multiplexes the main information signal and the coded signals by using a frequency multiplexing, for example, and also multiplexes the start control signal from control signal generating unit 4, and generates a transmission signal. In this case, the control signal is multiplexed by the multiplexer 5 by outputting a start control signal from the control signal generating unit 4 to the transmitter 6 as a transmission signal at a predetermined time for starting the display of the limited information signal, as an example. As a result, a signal as shown in Fig. 2c is obtained.

According to the above-described structure, a main information signal for transmitting program pictures, coded information of a limited information signal for transmitting the limited information signal such as commercial information and the area signal for showing the

area to which the limited information are applied and a start control signal for starting the display of the limited signal for displaying the limited information signal at a predetermined time can be multiplexed and transmitted. Accordingly, information closely linked to the areas of subscribers can be transmitted, and further, the display of this information can be started at a predetermined time. Further, since a signal for showing an applied area of the limited information and a limited information signal corresponding to this signal can be transmitted by a plurality of number in time-series by coding these signals, the areas to which the limited information signal is applied can be narrowed, so that further detailed information can be provided. Further, since the time for showing the pre-coded limited information signals in pictures is set all the same, the display of these limited information signals can be finished at the same time even if limited information signals of different areas or different subscribers are selectively displayed. Accordingly, it is possible to avoid an occurrence of a disturbance of program pictures structured by a main information signal depending on areas and subscribers. Further, since the main information signal and the coded limited information signals are transmitted by frequency-multiplexing these signals, limited information signals corresponding to many areas can be transmitted during the period while program pictures are being transmitted in the main information signal, so that further detailed information can be provided.

In the above-described embodiment, frequency multiplexing is applied for the multiplexer 5 to multiplex the main information signal and the coded limited information signals. However, the present invention is not limited to this, and these signals can also be multiplexed by time-division as shown below, for example. Signals which have been multiplexed by time-division are shown in Fig. 3. In Fig. 3, reference symbols a denotes a main information signal, c denotes a coded signal in which limited information signals and area signals are coded, and b denotes a transmission signal. The main information signal in Fig. 3a shows program pictures read from the main server 1 according to a predetermined time schedule, and covers in time-series a normal program such as a drama, a nation-wide commercial, a nation-wide weather forecast and a normal program, for example, as shown in Fig. 2a. The coded signal in Fig. 3c also covers in time-series a plurality of applied area codes and limited information codes which are the limited information signals and the area signals read from the sub-server 2 and then coded, similar to those in Fig. 2b. In this case, the plurality of limited information signals read from the sub-server 2 are set such that their display time in pictures is all the same. The multiplexer 5 at first time-axis compresses the main information signal at a predetermined time interval. Then, the multiplexer 5 also time-axis compresses the coded signal at a predetermined time interval. The multiplexer 5 then multiplexes in time-division the time-axis compressed

main information signal and coded signal respectively, and further multiplexes in time-division the start control signal, for example, from the control signal generating unit 4, so that a time-division multiplexed transmission signal shown in Fig. 3b is generated. In the above-described structure, limited information signals corresponding to many areas can also be transmitted during the period while a program is being transmitted in the main information signal, so that further detailed information can be provided.

In the above-described embodiment, the limited information signals and the area signals are transmitted in codes during the transmission of a normal program in the main information signal. However, the present invention is not limited to this. For example, a plurality of limited information signals and applied areas may also be coded and transmitted during a period while the limited information signals are being displayed. One example of the structure of signals in this case is shown in Fig. 4. Referring to Fig. 4, reference symbols a denotes a main information signal, c denotes a coded signal in which limited information signals and area signals are coded, and b denotes a transmission signal. The main information signal in Fig. 4a shows program pictures read from the main server 1 according to a predetermined time schedule, and covers a normal program such as a drama, for example, as shown. In this case, a non-signal period of a predetermined time period is set for the period when limited information signals are multiplexed. The coded signal in Fig. 4c also covers in time-series a plurality of applied area codes and limited information codes which are the limited information signals and the area signals read from the sub-server 2 and then coded, similar to those in Fig. 2a. In this case, the plurality of limited information signals read from the sub-server 2 are set such that their display time in pictures is all the same. The multiplexer 5 multiplexes the plurality of area codes in the coded signal and codes of the limited information signals and inserts the multiplexed codes into the non-signal period of the predetermined period of time of the main information signal. Further, the multiplexer 5 multiplexes the start control signal from the control signal generating unit 4 and thereby generates a transmission signal which is a time-division multiplexed signal of the main information signal and the coded signal. In this case, for multiplexing the codes of the plurality of limited information signals and the area codes, a time-division multiplexing or a frequency multiplexing is used, for example. In the above-described structure, limited information signals corresponding to many areas can also be transmitted during the period while a program is being transmitted in the main information signal, so that further detailed information can be provided.

In the above-described embodiment, the control signal for multiplexing by the multiplexer 5 is explained by only the start control signal from the control signal generating unit 4. However, the present invention is not

limited to this. For example, it is possible to arrange such that not only the start control signal but also menu information for facilitating the selection of a limited information signal at the subscribers side is transmitted. In this case, when subscribers want to display a limited information signal of an area different from a limited information signal of a pre-set area, the subscribers can easily select the limited information signal, which further increases the convenience of the subscribers.

In the above-described embodiment, the start control signal from the control signal generating unit 4 or not only the start control signal but also the menu screen information for selecting a limited information signal are multiplexed by the multiplexer 5 and transmitted. However, in addition to these control signals, it is also good to transmit and display end control signal for ending a display of a limited information signal at a predetermined time. In this case, when the end control signal is transmitted, the display of main information can be started compulsively even if the display of a limited information signal does not end within a predetermined time period from the display starting time due to an error of a storage medium at a subscriber side, for example. Thus, an occurrence of time loss in the program pictures in the main information can be avoided. Further, in the above-described embodiment, a control signal is multiplexed with the time for starting the display of limited information and then the signal is transmitted. However, the present invention is not limited to this, but the control signal may also be transmitted by the time when the limited information is started by multiplexing the control signal with a coded signal, for example. In this case, limited information can also be displayed at a predetermined time by receiving the control signal at a subscriber side. Thus, an effect similar to that obtained by the above-described embodiment can be obtained.

Next, an embodiment of the structure of the receiving apparatus for receiving picture signals transmitted from the transmitting apparatus of the above-described embodiment is shown in Fig. 5. In Fig. 5, reference numerals 11 denotes an extracting unit, 12 a decoding unit for decoding an applied area code, 13 a storage unit for storing limited information, 14 a control signal generating unit for generating a control signal of display information, 15 a decoding unit for decoding a limited information code, 16 a display control signal generating unit for displaying limited information, and 17 a change-over unit for changing over an output signal.

The operation will be explained below. The extracting unit 11 extracts a main information and a coded signal from a signal received by a receiving antenna or the like not shown. The extracted main information signal is supplied to the output change-over unit 17, and is output to the receiver not shown from the output change-over unit 17 during a transmission of a normal program. In the mean time, a coded signal extracted from the received signal is output to the applied area decoding unit 12 and the limited information storage unit 13. The

applied area decoding unit 12 extracts an applied area code from a coded signal, decodes this code to generate an area signal and then outputs this area signal to the limited information storage unit 13. The limited information storage unit 13 stores a limited information code in a storage medium based on an area signal supplied. The display control signal generating unit 16 detects a control signal for starting the display and a control signal for ending the display, for example, from a received signal, generates a display starting signal and a display ending signal based on these signals and supplies the generated signals to the limited information storage unit 13 and the output change-over unit 17. The control signal generating unit 14 generates a control signal for selecting a limited information signal to be displayed and supplies the signal to the limited information storage unit 13. The control signal generating unit 14 is structured to include a memory, for example, for storing an optional control signal set by a remote controller or the like in this memory, and generates each time a control signal for selecting a limited information signal corresponding to the code for showing an area of subscribers.

Next, the operation for displaying a limited information signal will be explained. For displaying a limited information, upon receiving a display starting signal from the display control signal generating unit 16, the limited information storage unit 13 reads a corresponding limited information code from a storage medium based on a control signal from the control signal generating unit 14, and outputs the limited information code to the limited information signal decoding unit 15. The limited information signal decoding unit 15 decodes the limited information code and supplies a limited information to the output change-over unit 17. The output change-over unit 17 changes over the output signal from the main information signal to the limited information signal based on the display starting signal from the display control signal generating unit 16. Next, for ending the display, the limited information storage unit 13 ends the reading of the limited information code from the storage medium based on the display ending signal from the display control signal generating unit 16, and the output change-over unit 17 changes over the signal to be output from the limited information signal to the main information signal. With the above-described structure, information closely linked to the areas of subscribers can be selectively displayed during a period for displaying the limited information signal, which increases the convenience of the subscribers. Further, even if an error has occurred in the limited information storage unit or the like, the main information can be displayed without displaying the limited information signal again by the display ending signal. Therefore, an occurrence of time loss in the program pictures can be avoided. Further, since the setting of a control signal in the control signal generating unit 14 can be stored in the memory, the control signal of the limited information sig-

nal can be set automatically, so that the subscribers need not set the control signal each time, which can increase the convenience of the subscribers.

In the above-described embodiment, the display control signal generating unit 16 detects a control signal for starting a display and a control signal for ending the display from a received signal and then generates a display starting signal and a display ending signal. However, the present invention is not limited to this, but only the control signal for starting the display may be detected, for example. In this case, the object of the present invention can also be met when the display control signal generating unit 16 generates a display starting signal based on the control signal for starting the display and a display ending signal after a predetermined time period since the display starting signal was generated, for example. Thus, information closely linked to the areas of subscribers can be displayed during a period for displaying the limited information signal. Further, even if an error has occurred in the limited information storage unit or the like, the main information can be displayed without displaying the limited information signal again. Therefore, an occurrence of time loss in the program pictures can be avoided.

In the above-described embodiment of the receiving apparatus, description has been made that a control signal for selecting a limited information signal to be generated by the control signal generating unit 14 is set by a remote controller or the like. However, the present invention is not limited to this, but the control signal can also be set through a telephone line as shown by a block diagram in Fig. 6, for example. In Fig. 6, reference numerals 20 denotes a telephone set, 21 a memory, 22 an initialization detecting unit, and 23 a telephone line. Referring to Fig. 6, for initializing a control signal, information for setting is sent from a transmitter side such as a broadcasting station not shown, for example, through the telephone line 23. Next, the initialization detecting unit 22 decides an applied area of a limited information for a subscriber based on the information for setting, and initializes the memory for the control signal for selecting a limited information signal. With this operation, the initialization of the control signal for a limited information signal can be automated so that the subscribers can save the setting work.

Further, in the above-described embodiment, description has been made that the control signal generating unit 14 generates a control signal for a limited information signal so as to select a limited information signal corresponding to the area of a subscriber each time. However, the present invention is not limited to this, but the control signal may also be generated by a subscriber's selection from the menu screen information transmitted when necessary, for example. The operation of the display control signal generating unit 16 and the control signal generating unit 14 in this case will be explained by using Fig. 5. The display control signal generating unit 16 detects menu screen information

from a received signal, generates selective screen information and outputs this information to the control signal generating unit 14. The control signal generating unit 14 generates a control signal for the area which the subscriber has selected from the selective screen information and supplies this control signal to the limited information storage unit 13. With the above-described operation, a subscriber can easily select a limited information signal of an area different from a limited information signal of a pre-set area, which further increases the convenience of the subscribers.

Claims

1. A method for transmitting information signals such as picture signals, comprises:

multiplexing a main information signal for transmitting program pictures and coded signals of a limited information signal relevant to a limited area such as commercial information and an area signal for showing an applied area of said limited information signal, and transmitting these signals by including a control signal for starting a display of said limited information signal at a predetermined time.

2. An information signal transmission method according to claim 1, wherein

a control signal for ending a display of said limited information signal at a predetermined time is included in said signals for transmission.

3. An information signal transmission method according to claim 1, wherein

there are a plurality of combinations of said limited information signals and said area signals and these are coded and transmitted in time series.

4. An information signal transmission method according to claim 3, wherein

all said plurality of limited information signals before they are coded have the same display time when they are displayed in pictures respectively.

5. An information signal transmission method according to claim 4, wherein

menu screen information is transmitted to enable a subscriber to select easily a limited information signal to be displayed on a picture receiver from said plurality of limited information signals.

6. An information signal transmission method according to claim 5, wherein

said main information signal, said limited information signal and said area signal are transmitted by being frequency multiplexed.

7. An information signal transmission method according to claim 5, wherein

at least said main information signal and said limited information signal are transmitted by being time-division multiplexed.

8. A method for transmitting information signals comprises:

multiplexing in time-division a main information signal for transmitting program pictures and coded signals of a plurality of limited information signals relevant to limited areas such as commercial information and a plurality of area signals for showing applied areas of said limited information signals, and transmitting these signals so that said coded signals are transmitted at a predetermined time.

9. A transmitting apparatus for transmitting information signals such as picture signals, comprising:

storage means for storing a main information signal such as program pictures, a limited information signal which is information relevant to limited areas such as commercial information and an area signal for showing an applied area of said limited information signal, coding means for coding said limited information signal read from said storage means and said area signal, control signal generating means for generating a control signal relevant to said display of said limited information signal, and multiplexing means for multiplexing said main information signal output from said storage means, said coded signal from said coding means and said control signal from said control signal generating means and for generating a transmission signal.

10. A transmitting apparatus according to claim 9, wherein

said control signal generating means includes means for generating a control signal for starting a display of said limited information at a predetermined time at a subscriber side.

11. A transmitting apparatus according to claim 10, wherein

said control signal generating means includes means for generating a control signal for ending a display of said limited information at a predetermined time at a subscriber side.

12. A transmitting apparatus according to claim 9, wherein

there are a plurality of combinations of said limited information signal and a signal for showing said applied area of said limited information signal and said transmitting apparatus further includes means for outputting in time series said limited information signals and said area signals coded by said coding means.

13. A transmitting apparatus according to claim 12, wherein

said coding means includes means for coding a plurality of limited information signals so that display time for all said limited information signals becomes equal when said plurality of limited information signals before coding are displayed in pictures.

14. A transmitting apparatus according to claim 13, wherein

said control signal generating means includes means for generating menu screen information for enabling a subscriber to select a limited information signal to be displayed on a receiver from a plurality of limited information signals.

15. A transmitting apparatus according to claim 14, wherein

said multiplexing means includes means for frequency multiplexing at least said main information signal and said coded signals.

16. A transmitting apparatus according to claim 14, wherein

said multiplexing means includes means for time-axis compressing and time-division multiplexing at least said main information signal and said coded signals.

17. A transmitting apparatus according to claim 9, wherein

said multiplexing means includes means for time-division multiplexing coded signals of a plurality of said limited information signals and said area signals so that their transmission time becomes a predetermined time.

18. An information signal receiving apparatus for receiving an information signal transmitted by multiplexing a main information signal such as program pictures, coded signals of a limited information signal relevant to a limited area such as commercial information and an area signal for showing an applied area of said limited information signal and a control signal relevant to a display of said limited information, comprising:

means for extracting said main information signal and said coded signal from a received signal, means for decoding a signal for showing an applied area from an extracted coded signal, display control signal generating means for detecting a control signal relevant to a display of a limited information signal from said received signal and for generating a display control signal based on said detected signal, control signal generating means for generating a control signal for selecting a limited information signal to be displayed, limited information storage means for storing a limited information signal coded according to said decoded signal for showing an applied area, and for reading a coded limited information signal corresponding to said control signal based on a timing of said display control signal, means for decoding a limited information signal from a signal read from said limited information storage means, and output change-over means for selecting a main information signal from said extracting means based on a display control signal from said display control signal generating means and an output signal from a limited information signal from said limited information signal decoding means.

19. A receiving apparatus according to claim 18, wherein

said display control signal generating means includes means for generating a display control signal for controlling such that a main information signal is displayed after a predetermined period of time since said display control signal generating means has started a display of a limited information signal.

20. A receiving apparatus according to claim 19, wherein

said control signal generating means includes memory means for storing an optional control signal for selectively displaying an optional one of said limited signals.

21. A receiving apparatus according to claim 20,

wherein

a telephone line is connected to said control signal generating means and said control signal generating means includes means for setting a control signal through said telephone line.

22. A receiving apparatus according to claim 18, wherein

said control signal relating to said display includes menu screen information, said display control signal generating means includes means for generating selective screen information for facilitating a selection of said limited information signal from said menu screen information, and said control signal generating means includes means for generating a control signal based on said selective screen information.

23. A receiving apparatus according to claim 18, wherein

said control signal relating to said display includes a signal relating to a time for starting a display of said limited information signal and said display control signal generating means includes means for generating a display control signal for starting a display of said limited information signal at a predetermined time based on said signal relating to said time for starting said display.

24. A receiving apparatus according to claim 23, wherein

said control signal relating to said display includes a signal relating to a time for ending a display of said limited information signal and said display control signal generating means includes means for generating a display control signal for ending a display of said limited information signal at a predetermined time based on said signal relating to said time for ending said display.

FIG. 1

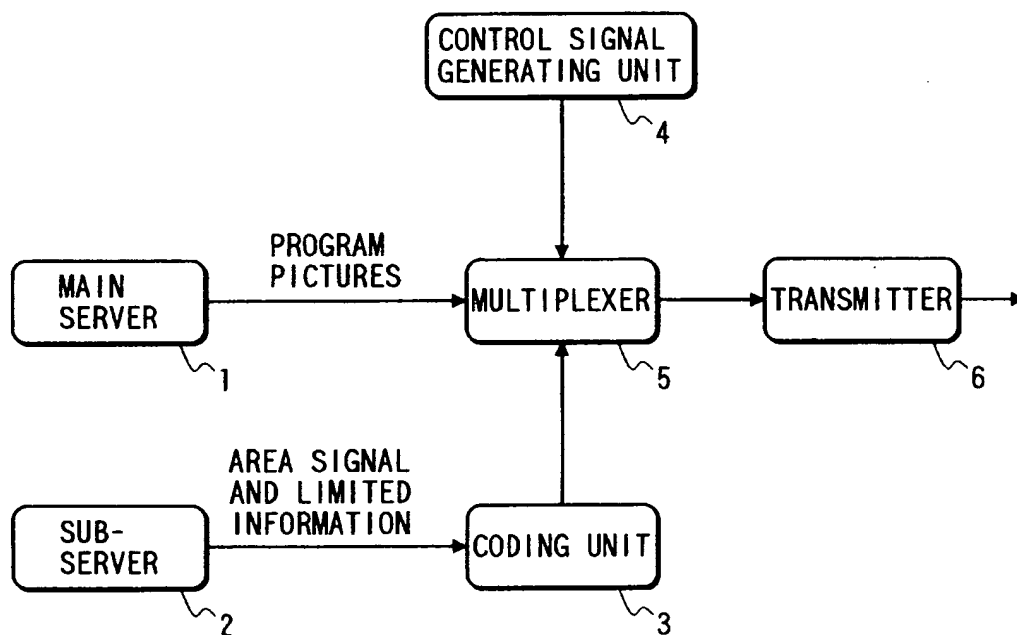


FIG. 2

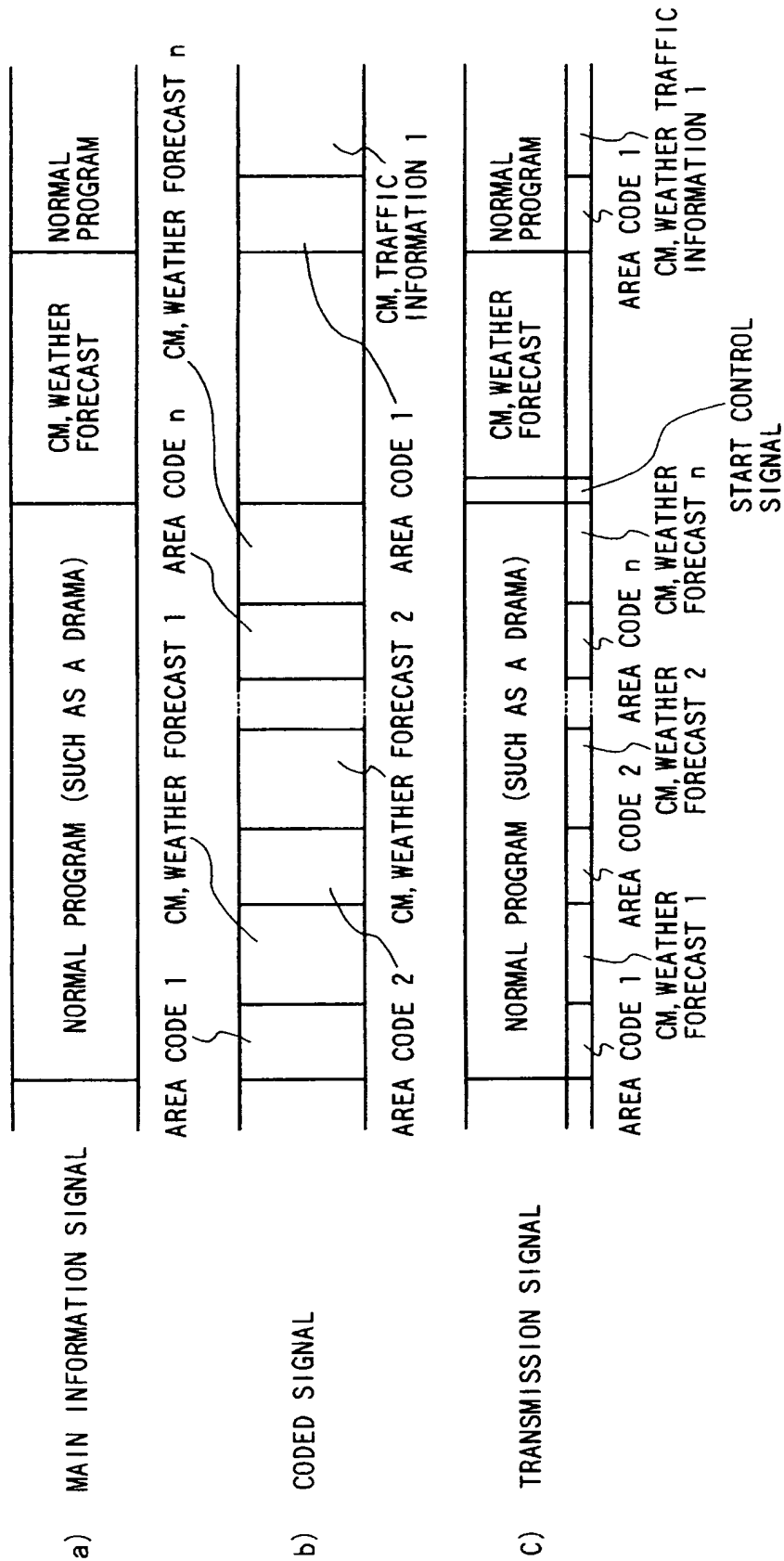


FIG. 3

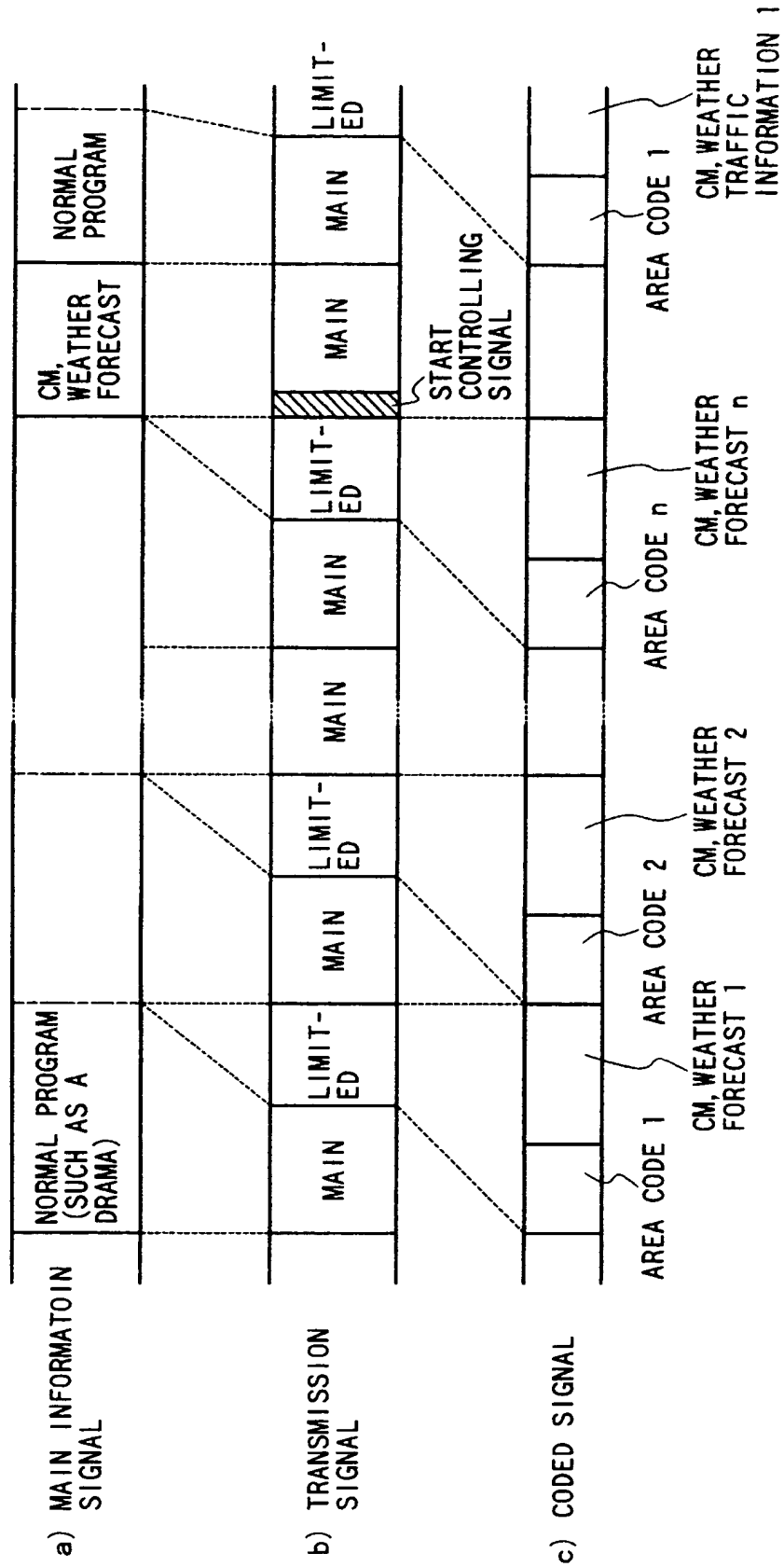


FIG. 4

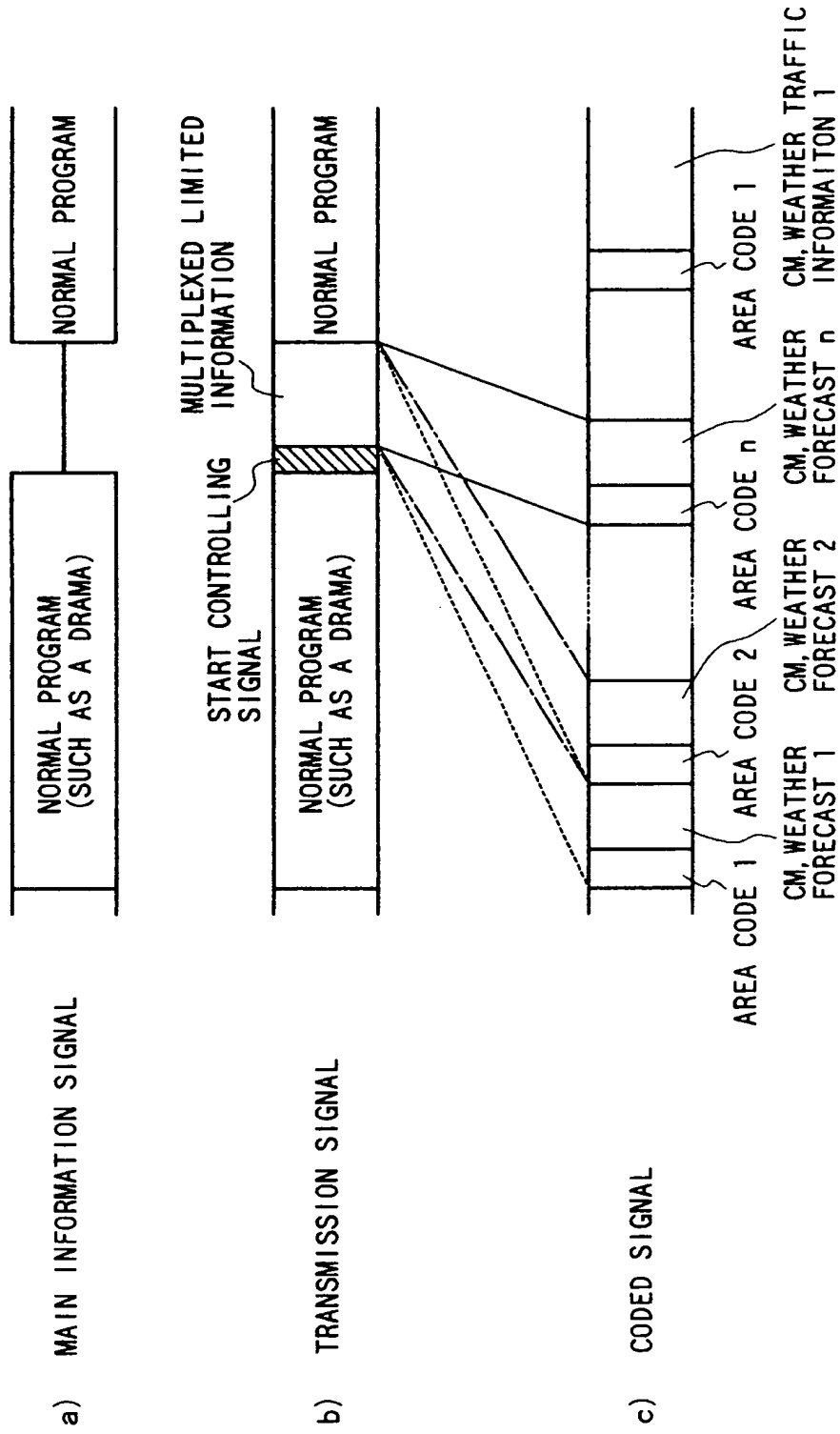


FIG. 5

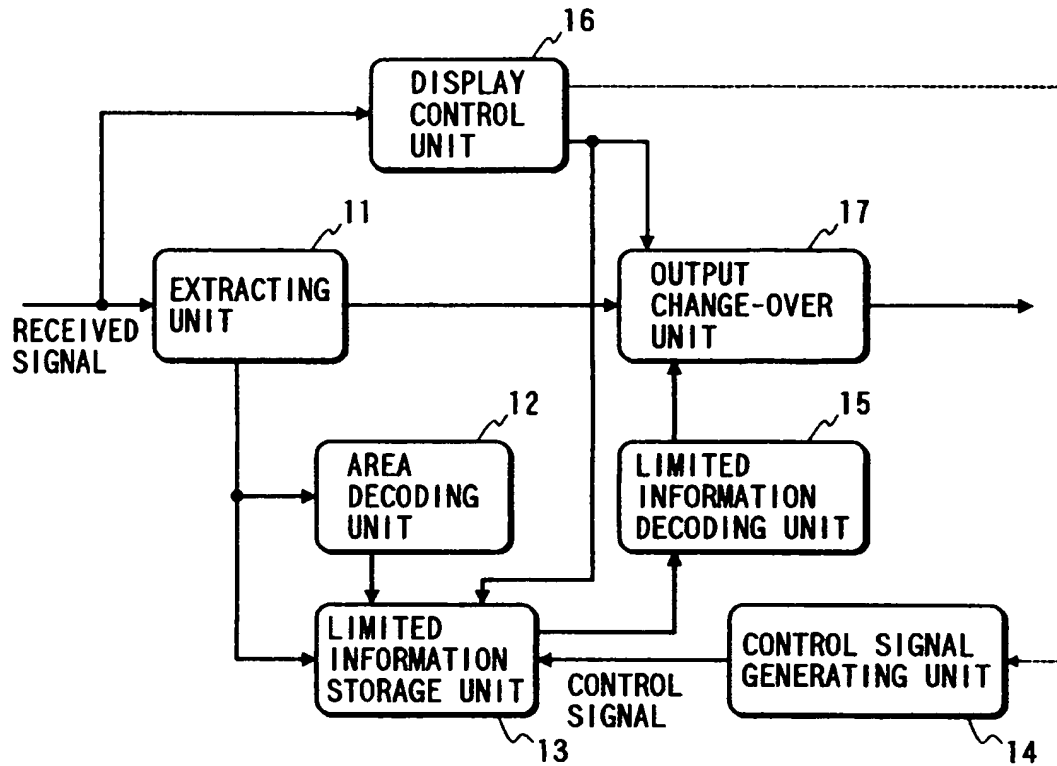


FIG. 6

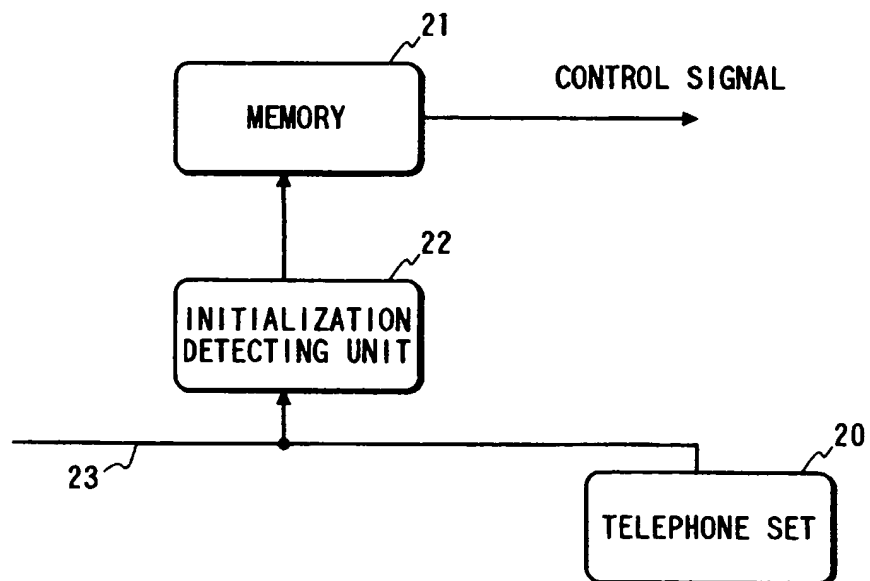


FIG. 7

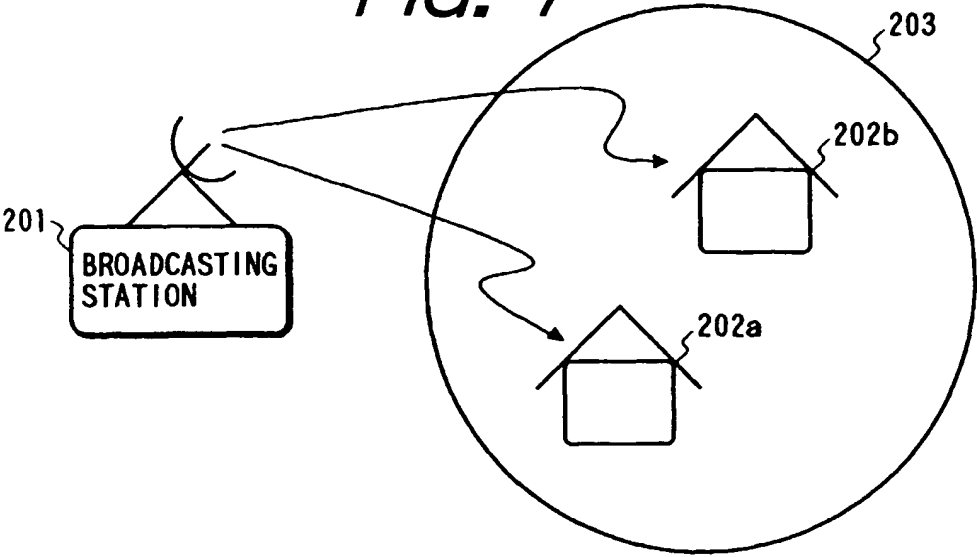


FIG. 8

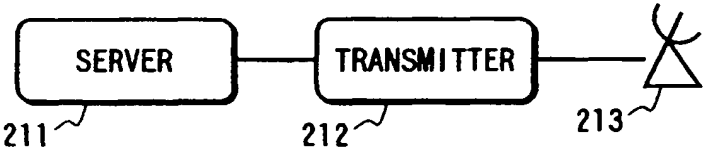


FIG. 9



FIG. 10



**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☒ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.